

**THE EUROPA JUPITER SYSTEM MISSION:
A PATHFINDER FOR FUTURE LANDINGS IN THE JUPITER SYSTEM**

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ABSTRACT

The Europa Jupiter System Mission (EJSM) will be the first joint ESA-NASA mission of the Jupiter system. Its concept results from the merging of ESA's Cosmic Vision Laplace proposal and NASA's two Outer Planets Flagship mission studies, "Europa Orbiter" and "Jupiter System Observer". The reference mission architecture consists of the following two elements :

- A Jupiter Ganymede Orbiter (JGO), to be developed and launched by ESA.
- A Jupiter Europa Orbiter (JEO), to be developed and launched by NASA.

The two EJSM flight elements, JGO and JEO, are designed to execute an extended choreographed exploration of the Jupiter System before they settle into orbit around Ganymede and Europa, respectively. JGO and JEO will be flying on two complementary trajectories and will carry complementary instruments (cameras, UV and IR spectro-imagers, thermal mapper, laser altimeters, sub-surface radars, magnetometers, plasma and wave detectors) to achieve the following main science objectives: characterize Ganymede and Europa as planetary objects and potential habitats, study Ganymede, Europa, Callisto and Io in the broader context of the system of Galilean satellites, and focus on Jupiter science including the planet, its atmosphere and the magnetosphere as a coupled system.

The mission scenario will consist of the Jupiter phase with remote survey of the atmosphere and in situ investigation of the magnetosphere of the giant planet, and multiple flybys of Galilean satellites, followed by detailed investigations of Ganymede and Europa by JGO and JEO respectively. In addition to global coverage of these moons at medium resolution, few percent of Europa's and Ganymede's surfaces will be thoroughly investigated using:

- Panchromatic imaging at a few meters/pxl
- IR and UV hyperspectral imaging at a few 100 m/pxl
- Subsurface sounding varying from x100 m to several km depth
- High precision laser altimetry

EJSM will be a definitive step to more ambitious future exploration of the Jupiter system. High resolution topographical, geological, morphological and chemical characterization of Europa and Ganymede will facilitate selection of the landing sites for the future missions, especially related to astrobiological investigations.